

STEREO MOC Status Report
Time Period: 2016:319 - 2016:325

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 319, during the DSS-25 support, in parallel with the operational track, a DSN PIT was conducted using the backup command workstation to test the TTC Software v1.3 for SLE Return Services. The backup workstation was connected to the test SLE server at the DSN. Real-time telemetry and monitor data were identical between the SLE test server and the operational server.
- On day 323, during the DSS-55 support, the MOC received real-time telemetry at 1022z 37 minutes late due to a DCD issue. Also, the uplink sweep was 29 minutes late due to transmitter interlock anomaly. These anomalies resulted in the loss of 29 minutes of commanding and two-way tracking data and 56 frames of SSR data and 85 frames of real-time telemetry. See DR# M109662 and M109663 for more information.

2. The following spacecraft/instrument events occurred during this week. The Ahead observatory operated nominally during this week.

- On day 319, at 1342z, MOps macro release 1.1.30 was loaded to C&DH EEPROM and verified. This release updates, via macro 0, the post system reset RF configuration to the -Z LGA/HGA/+Z LGA each for 24 hours maintaining the emergency data rates throughout.
- On day 321, the 93rd momentum dump was executed successfully at 1430z, which imparted an estimated delta V of 0.104 m/sec. This was the 12th momentum dump that did not use the IMU. After thruster operations completed, pointing performance was poor for the next 21 hours through ~322-1134z due to wheel 3 running along the zero-speed avoidance band but with its speed decreasing between avoidance computation updates. The performance improved dramatically after 322-1134z because wheel 3 changed spin directions and moved away from zero speed bands.

- On day 322, SECCHI team conducted real-time commanding to investigate a COR1 zone1 internal autonomy rule. Nominal science operations resumed by 2000z. The rule will be re-enabled when an updated autonomy table is loaded.
- The average daily science data return for Ahead was 4.4 Gbits during this week.

STEREO Behind (STB) Status:

1. The Behind loss of communication anomaly occurred on October 1, 2014. Post superior solar conjunction, recovery operations resumed on November 30, 2015. By implementing the NASA Failure Review Board recommendations, the first recovery attempt began with carrier detection by the DSN on August 21st, through September 23, 2016. At a spacecraft range of ~2 AU, the observatory was found to be rotating slowly about its principal axis of inertia for which the uncontrolled attitude allowed some solar array input and continuous uplink and downlink communications on the LGA at emergency data rates. Over the next 22 continuous days, significant obstacles to recovery were overcome with a collaborative effort of the JHU/APL engineering team, NASA GSFC, DSN, FDF, SSMO scheduling, and Mission Operations teams. This consisted of:

- Reliably commanding a rotating spacecraft with uncontrolled attitude at a distance of 2 AU
- How to power on the spacecraft that was never designed to be off without collapsing the battery voltage
- Acquiring telemetry at 35 bps from a spacecraft that is rotating with an uncontrolled attitude
- Warming a frozen propulsion subsystem with a degraded battery and limited solar array input with an uncontrolled attitude
- Configuring, loading, and verifying EA, C&DH, and G&C parameters and macros with very limited telemetry
- Conducting an autonomous momentum dump in the blind and transitioning to C&DH standby mode and successfully receiving telemetry on the HGA indicating star tracker lock and decreasing system momentum.

However, system momentum level remained above the threshold for re-establishing attitude control with the reaction wheels. Due to the uncontrolled attitude, communication degraded and the last detection of the carrier was on September 23rd.

Behind Observatory Status - From the last telemetry received on September 18th, main bus voltage is low, 2 out of 11 battery cells are currently not functioning, attitude remains uncontrolled, rotating at a ~45 second period about its principal axis of inertia. While propellant is suspected to be frozen, last telemetry indicated both propulsion tank latch valves are open and pressure transducer #2 is not functioning. EA mode is enabled. The battery charge rate is C/10. Necessary macro sequences have been tested to allow the peak power tracker in C&DH standby mode to protect the battery. These macro sequences will be loaded to EEPROM when the communications supports longer commands.

Monthly recovery efforts consist of attempting to power on the transmitter for 30 minutes. If no carrier signal is detected, battery recovery operations will commence which consist of repeatedly sweeping a 3 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off.

2. Detailed status of the recovery activities this week to restore operations are listed below.

- None.